CHAPTER 30

BLAST PROTECTION AND DETECTION SYSTEM

30-1. General blast protection and detection systems

Blast protection and detection systems guard hardened facilities from the effects of an attack external to the facility. These systems consist of blast sensors, relay panels, blast valve systems, blast door systems, and the electrical system.

30-2. Sensors

Blast sensors are located in the control circuit of the valve closure system. These sensors are physically located on the exterior surface of the facility or opening to be protected. When a sudden increase in air pressure is sensed, as a result of an external explosion, the sensor activates the valve closure through a relay and also provides a visual and audible alarm.

30-3. Relay panels

The relay panels in the blast system are a part of the electrical system and contain the relaying necessary for the controls of the protective functions afforded by the blast valve system.

30-4. Blast valve systems

Blast valves are used as intake and outlet air ventilation valves in blast protected buildings to block out the destructive effects of explosions. All valve types are tested with multiple blast loads over the entire load range from high peaked short duration load to quasi-static long duration blast load.

a. Mounting. Self-acting blast valves consist of blast valve units and mountings. Openings and supports to accommodate the proposed valve system are designed using loads computed from the blast overpressures specified or indicated.

b. Operation. Blast valve units are installed in each opening of the facility and close under the positive blast overpressures specified or indicated and are fully operational after the blast. The actuation of the valve then seals the opening to prevent entry of undesirable environmental conditions and to allow the facility to remain habitable, protecting the safety of the facility occupants. Units operate under a zero rise time, with a sustained (infinite duration) blast overpressure. Casing-mounted exhaust valve units operate under a zero rise time, sustained (infinite duration) blast overpressure. Blast valve units are removable from casings or other mountings. Except for airflow openings, any penetrations through the valve system shall be sealed against blast leakage through the penetration. Valve casing supports are structural steel fabricated. Valves installed in piping systems are flange connected.

30-5. Blast door systems

Entrances that do not incorporate decontamination facilities are provided with an airtight door behind a pair of blast proof exterior doors resulting in two contiguous chambers: a blast lock and a vestibule.

a. Blast lock. The blast lock between the blast doors allows opening of one blast door at a time. This permits ingress and egress without loss of interior air pressure, interruption of the blast protection, or direct entry of air into the facility. Mounted above the exterior blast door is a blast closure and above the inner blast door an anti-backdraft valve. These fittings are connected in series by a blast proof ceiling cavity above the blast lock. This allows continuous exhaust of air from the vestibule under a controlled pressure differential independently from the use of the blast lock.

b. Vestibule. The vestibule between the blast door and the airtight door is a pressurized and ventilated air lock that allows for dilution and exhaust of any outside air introduced in the vestibule by the movement of personnel through the inner blast door. Mounted above the airtight door separating the vestibule from the rest of the facility is an air pressure regulator to supply scavenging air to the vestibule under a controlled pressure differential